User Manual

S Line Outdoor Touch Panel

Part Number:	80860.768
Version:	4
Date:	2014-08-06
Valid for:	TPE057AGQ TPE043AGB TPE070AGW

Version	Date	Modifications
1	2010-08-06	First Edition
2	2011-09-01	TPE043ATB and TPE070ATW added
3	2012-07-19	New product designations: TPE057AGQ, TPE043AGB, TPE070AGW Interfaces: RS422/RS485 modified Technical data: Application area modified Connecting the device: Torque specifications added
4	2014-08-06	TPE070AGW UL approval added

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1 Important Notes

1.1 Symbols

The symbols in this manual are used to draw your attention on notes and dangers.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

DANGER
This indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING
This indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION
This indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE
This symbol together with the signal word NOTE and the accompanying text alert the reader to a situation which may cause damage or malfunction to the device, hardware/software, or surrounding property.

This symbol and the accompanying text provide the reader with additional information or refer to detailed sources of information.

1.2 Safety Notes

- Read this manual carefully before using the operating device. Keep this manual in a place where it is always accessible to all users.
- Proper transportation, handling and storage, placement and installation of this product are prerequisites for its subsequent flawless and safe operation.
- This user manual contains the most important information for the safe operation of the device.
- The user manual, in particular the safety notes, must be observed by all personnel working with the device.
- Observe the accident prevention rules and regulations that apply to the operating site.
- Installation and operation must only be carried out by qualified and trained personnel.

1.3 Intended Use

– The device is designed for use in the industry.
– The device is state-of-the art and has been built to the latest standard safety requirements. However, dangerous situations or damage to the machine itself or other property can arise from the use of this device.
– The device fulfills the requirements of the EMC directives and harmonized European standards. Any modifications to the system can influence the EMC behavior.

1.4 Target Group

The use of products described in this manual is oriented exclusively to:

– Qualified electricians or persons instructed by them, who are familiar with applicable standards and other regulations regarding electrical engineering and, in particular, the relevant safety concepts.
– Qualified application programmers and software engineers, who are familiar with the safety concepts of automation technology and applicable standards.

2 Installation and Commissioning

2.1 Unpacking the Device

Unpack all parts carefully and check the contents for any visible damage in transit. Also check whether the shipment matches the specifications on your delivery note.

If you notice damages in transit or discrepancies, please contact us immediately.

2.2 Mounting the Device

NOTICE: Damage
When installing the device, leave a gap of at least 30 mm (1.181") around the device to ensure sufficient air circulation.

NOTICE: Damage
When the operating device is installed horizontally, please note that additional sources of heat beneath the operating device may result in heat accumulation. Make sure to allow sufficient heat dissipation!
Please observe the permissible temperature range specified in the technical data of the user manual when operating the device.

NOTICE: Damage
To maintain the specified degree of protection, make sure the seal is evenly seated on the installation surface and the hexagon nuts are tightened uniformly to a maximum torque of 1 Nm.

The operating device can be easily and quickly mounted from the rear of the operating device. A panel thickness of approx. 1 mm to 6 mm (0.039" to 0.236") is permitted for proper mounting.

1. Cut out the mounting rectangle from the mounting plate.
2. Drill the holes with the given diameter.
3. Remove the burrs from the cutting edges and drillings.
4. Insert the operating device from the front through the mounting cutout.
5. Fasten the operating device using M4 hexagonal nuts.

2.2.1 Front Panel Dimensions

2.2.1.1 TPE043AGB

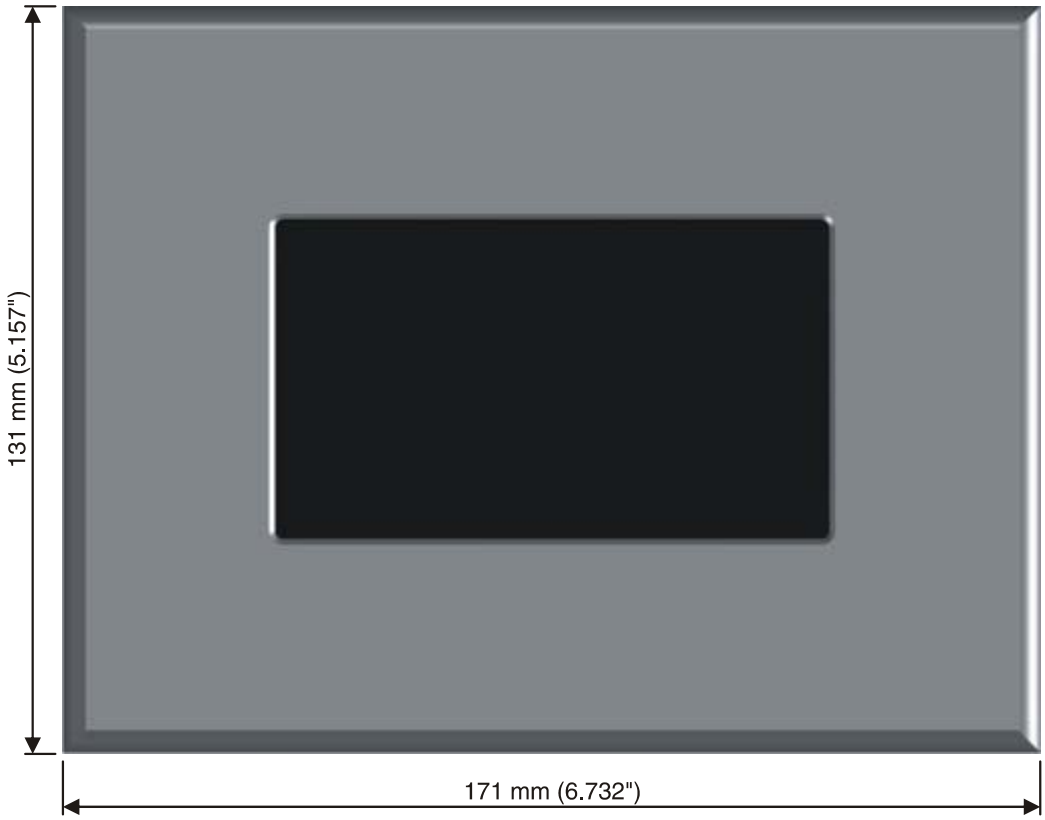

Bild 2-1 TPE043AGB

2.2.1.2 TPE057AGQ

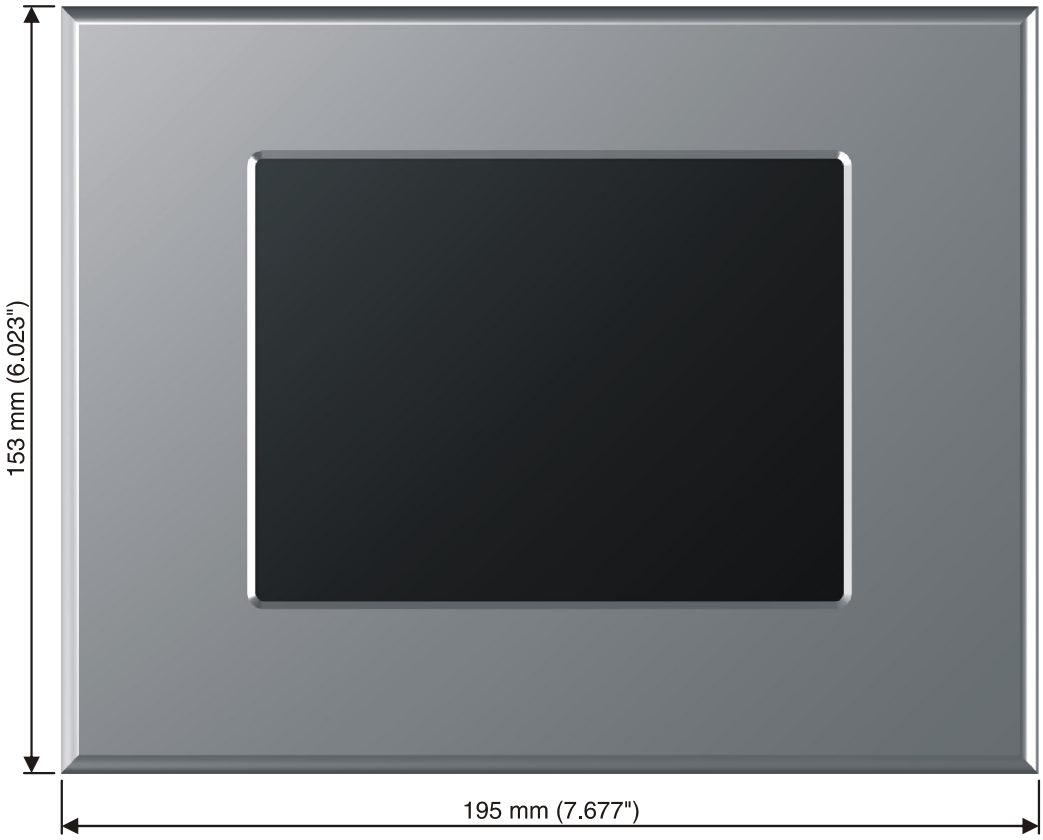

Bild 2-2 TPE057AGQ

2.2.1.3 TPE070AGW

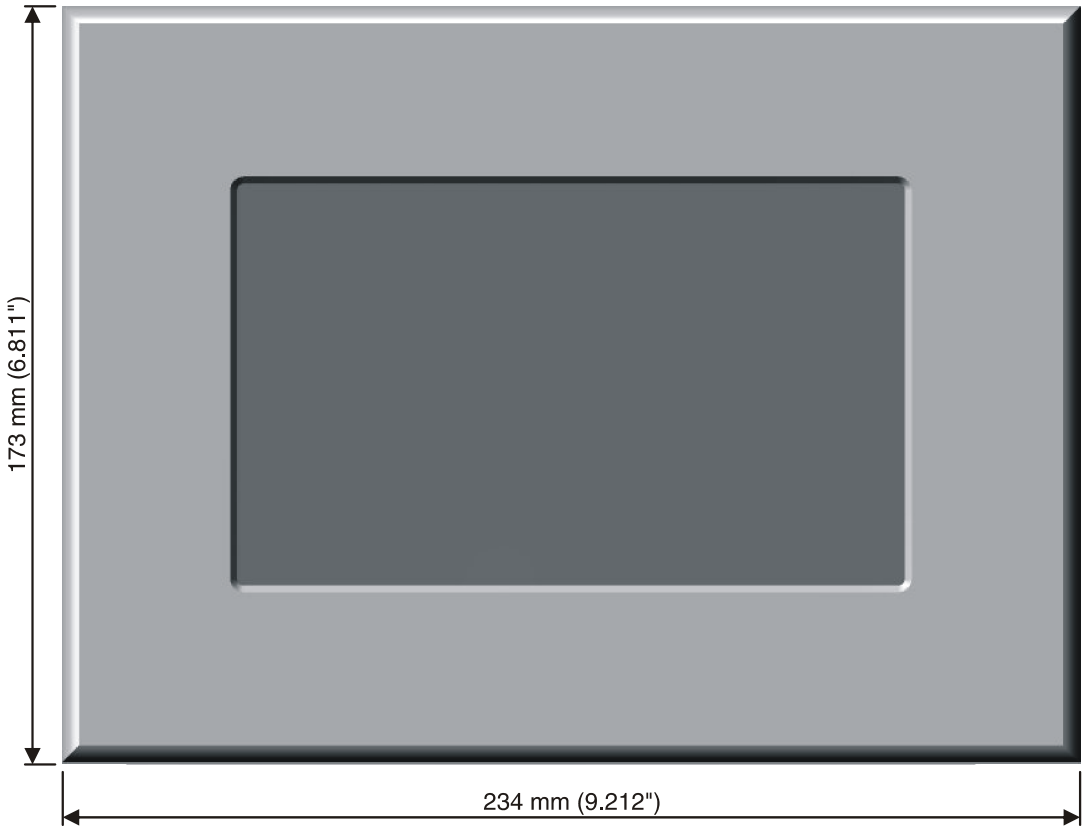

Bild 2-3 TPE070AGW

2.2.2 Mounting Cutout

2.2.2.1 TPE043AGB

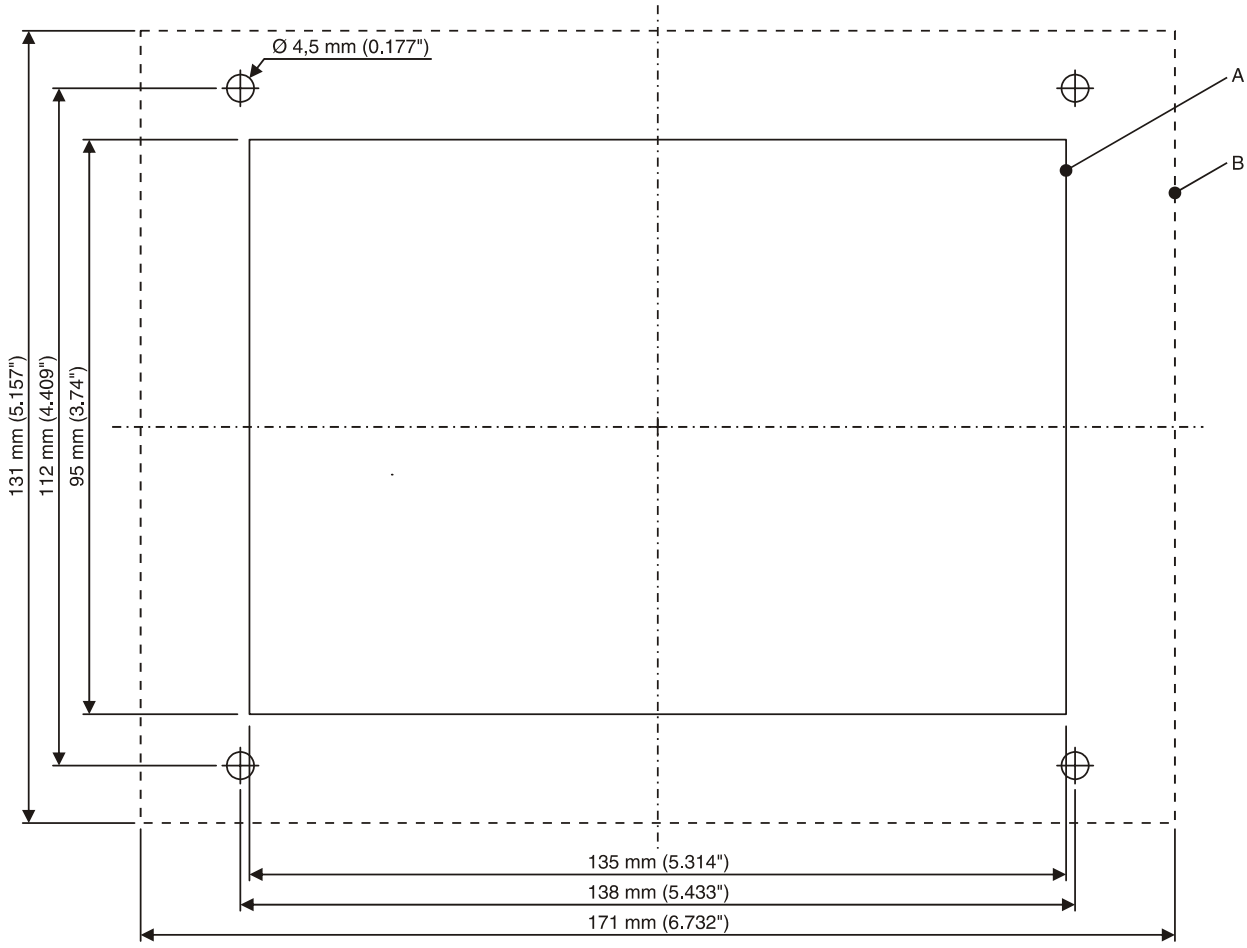

Bild 2-4 TPE043AGB

A Mounting Cutout
B Front Panel

2.2.2.2 TPE057AGQ

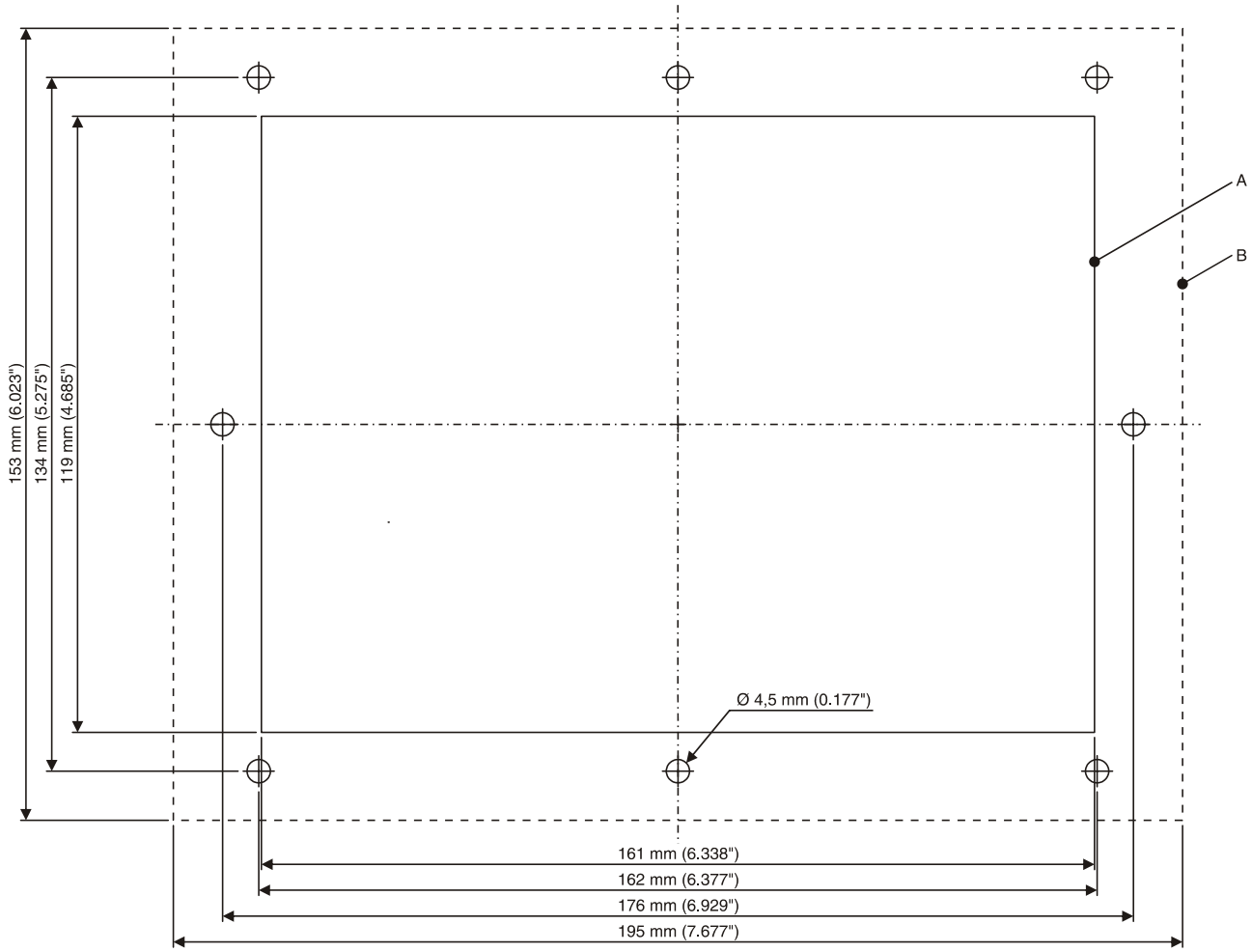

Bild 2-5 TPE057AGQ

A Mounting Cutout
B Front Panel

2.2.2.3 TPE070AGW

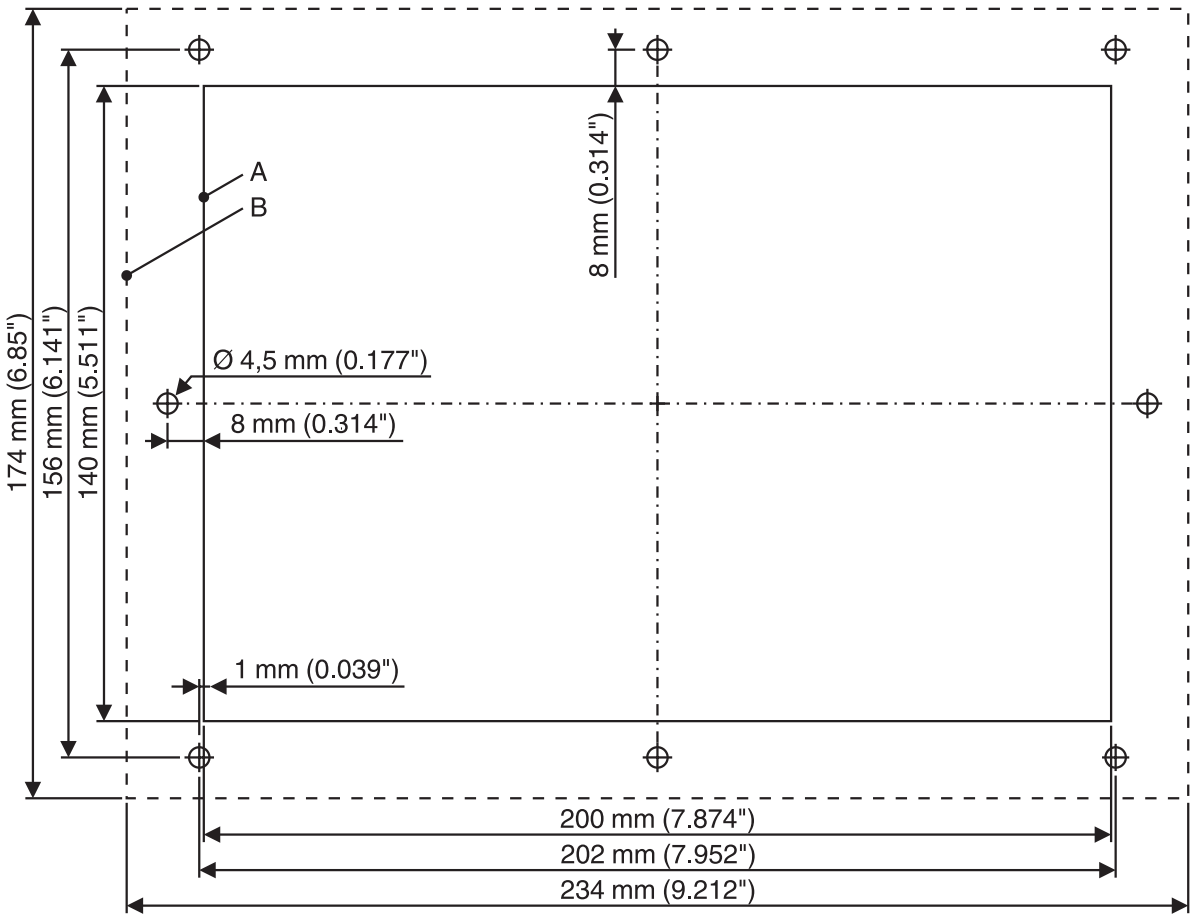

Figure 2-6 TPE070AGW

A Mounting Cutout
B Front Panel

2.2.3 Side View, Mounting Depth

2.2.3.1 TPE043AGB

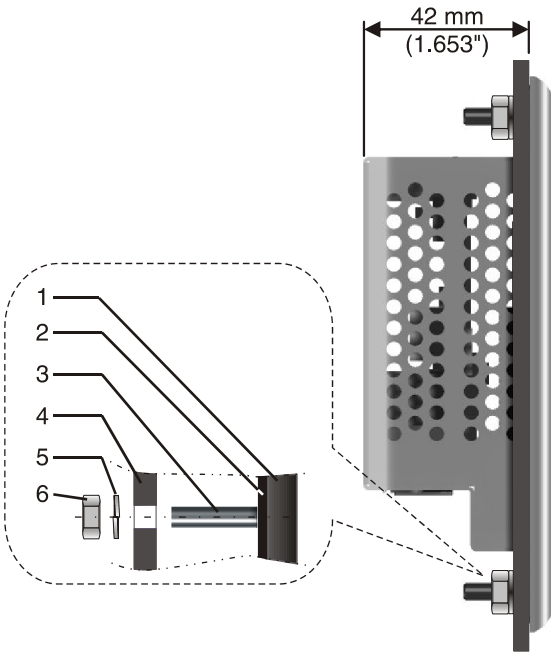

Bild 2-7 TPE043AGB

1 Front Panel
2 Circumferential Seal
3 Press-in Threaded Bolt M4 x 16 mm (0.629")
4 Mounting Surface Thickness 1 mm to 6 mm (0.039" to 0.236")
5 Spring Lock Washer B4 DIN 127 Form B (not supplied)
6 Nut M4 DIN 934 (not supplied)

2.2.3.2 TPE057AGQ

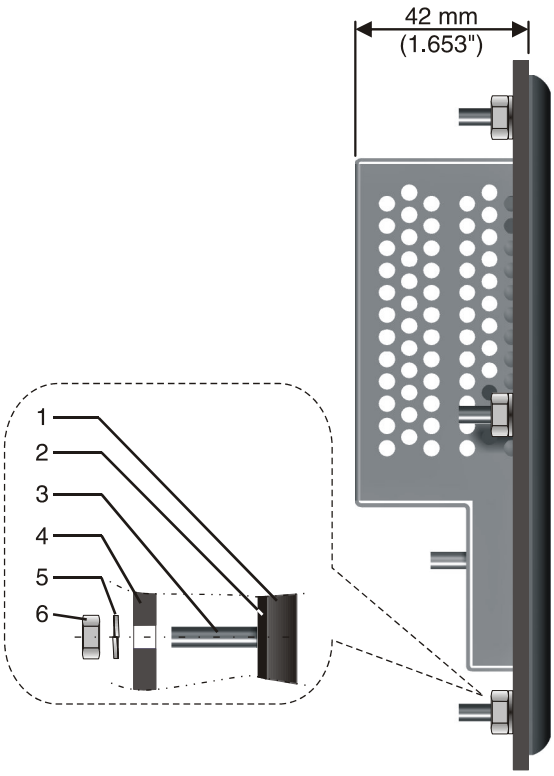

Bild 2-8 TPE057AGQ

1 Front Panel
2 Circumferential Seal
3 Press-in Threaded Bolt M4 x 16 mm (0.629")
4 Mounting Surface Thickness 1 mm to 6 mm (0.039" to 0.236")
5 Spring Lock Washer B4 DIN 127 Form B (not supplied)
6 Nut M4 DIN 934 (not supplied)

2.2.3.3 TPE070AGW

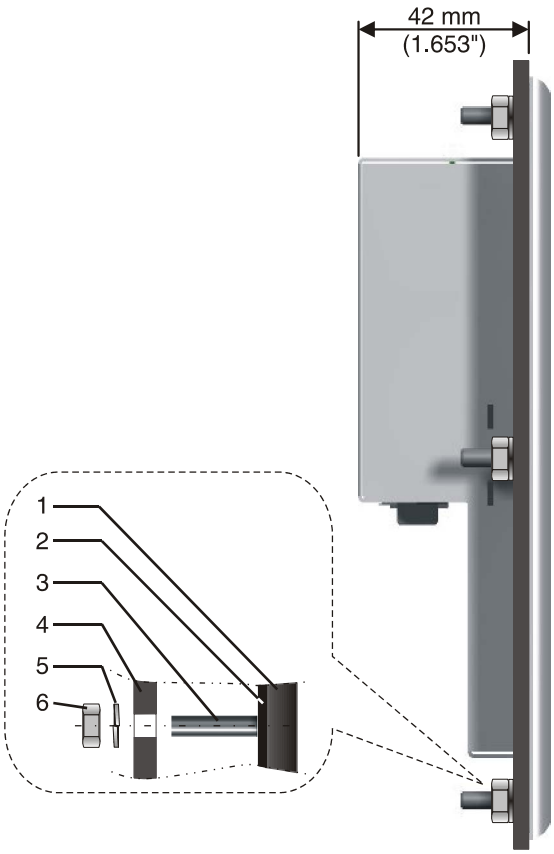

Bild 2-9 TPE070AGW

1 Front Panel
2 Circumferential Seal
3 Press-in Threaded Bolt M4 x 16 mm (0.629")
4 Mounting Surface Thickness 1 mm to 6 mm (0.039" to 0.236")
5 Spring Lock Washer B4 DIN 127 Form B (not supplied)
6 Nut M4 DIN 934 (not supplied)

2.3 Connecting the Device

2.3.1 Supply Voltage

The supply voltage is supplied via pin strip X1. A suitable socket strip is supplied.

Refer to the technical data for the permissible supply voltage of the operating device.

The device has reverse polarity protection. In case of wrong polarity, the device will not operate.

This is a protection class I device. For safe operation, safety extra-low voltage (SELV) in accordance with DIN EN 61131 must be used for the supply voltage.

Connector in the operating device: 3 pin pin strip

Table 2-1 Pin assignment supply voltage

Pin	Designation	Function
1	⏚	Noiseless ground / functional earth ground (FE)
2	0 V	Supply voltage 0 V (GND)
3	⎓ 24 V	Supply voltage ⎓ 24 V

DANGER: Hazardous voltages
Hazardous voltages can exist inside electrical installations that can pose a danger to humans. Coming in contact with live parts may result in electric shock!

NOTICE: Damage
Cables with finely stranded copper conductors with a minimum cross-section of 0.75 mm² (18 AWG) and a maximum cross-section of 2.5 mm² (14 AWG) must be used for the supply voltage.
You must adhere to the following torques at the connector:
Screw connection of terminal blocks: 0.22 Nm (minimal) to 0.25 Nm (maximum)
Screw flange: 0.3 Nm (maximum)

Use the following procedure to connect the device to the supply voltage:

1. Strip approx. 30 mm (1.181") off the outer cable sheath and approx. 5 mm (0.197") off the wires.

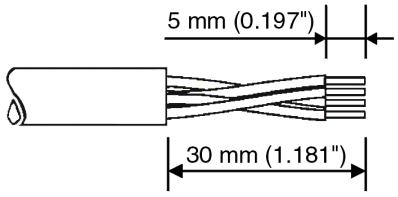

Figure 2-10 Preparing the cable

2. Fit the wires with wire end ferrules and connect the wires to the socket strip.
3. Plug the socket strip onto pin strip X1.
4. Secure the socket strip in place with a screw-type locking to prevent it from slipping out.

2.3.2 Grounding

The grounding is performed - depending on the type of device - with a slip-on sleeve (noiseless ground / functional earth ground) or a ring cable lug (protective ground).

NOTICE: Damage
A separate copper conductor must always be provided for the grounding. The conductor must have a minimum cross-section of 1.5 mm² (16 AWG) and must be kept as short as possible.
You must adhere to a maximum torque of 1 Nm at an protective grounding on the threaded bolt.

1. Strip approx. 5 mm (0.197") off the wires.
2. Fit the stripped wires - depending on the type of device - with a slip-on sleeve or a ring cable lug.
3. Plug the slip-on sleeve on the flat tab or mount the ring cable lug with the nut to the threaded bolt.

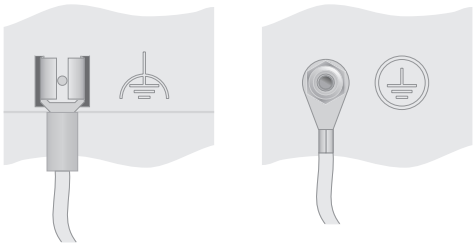

Figure 2-11 Noiseless ground / protective ground

2.4 Switching On

The Windows CE operating system is installed on the operating device. Running on the operating system is the visualization runtime.

2.4.1 Loading Procedure on Windows CE Operating Procedure

The program allows you to use the buttons to make changes to the configuration.

The operating device has 3 operating modes:

– Normal (no button is pressed)
– Setup Main (Button **Press For Setup Main Menu** was pressed)
– Administration (**Admin** button was pressed)

2.4.1.1 Launch Structure

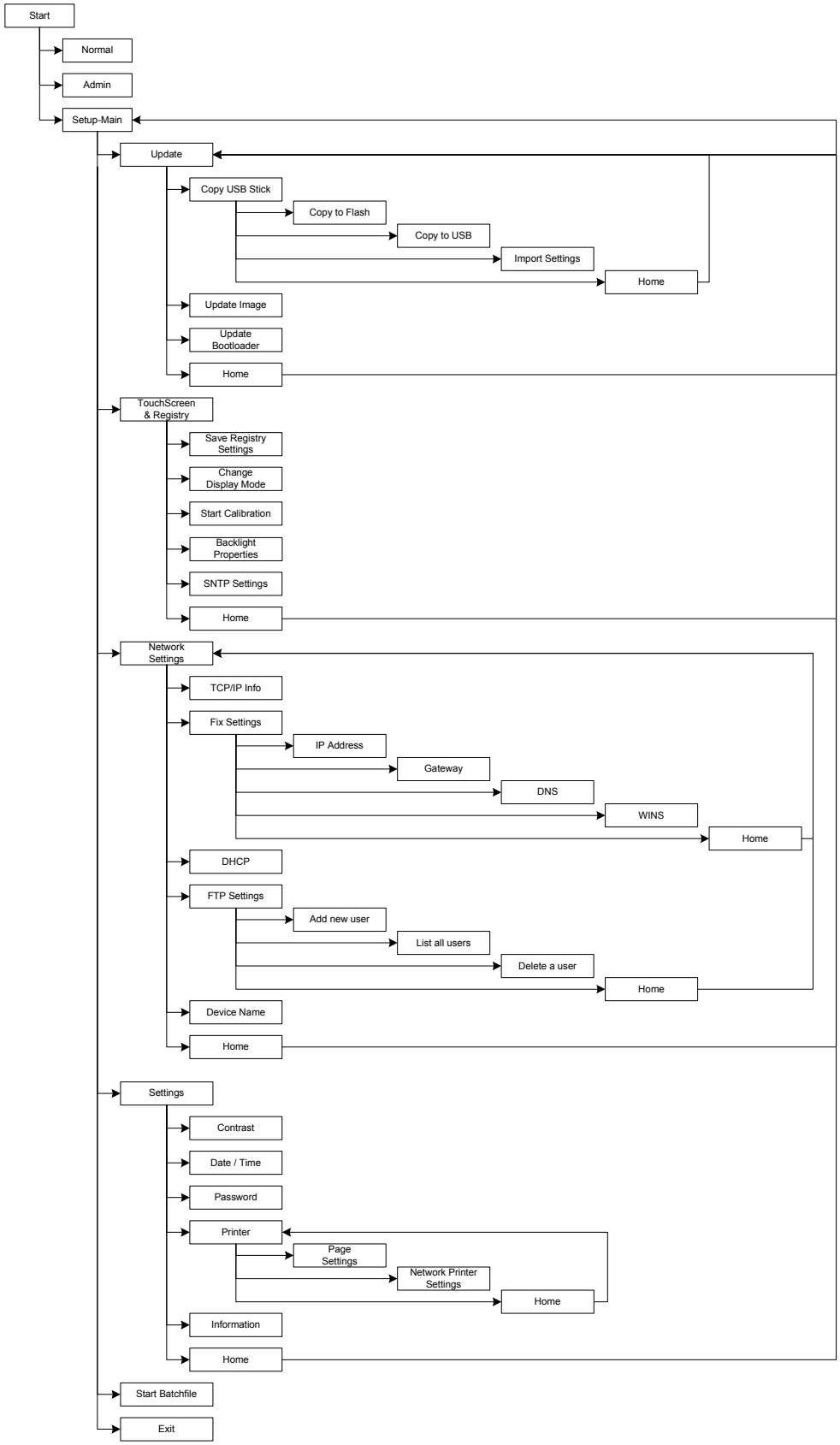

Bild 2-12 Launch structure

2.4.1.2 Normal Mode

The program AppStarter.exe starts from the internal Flash memory.

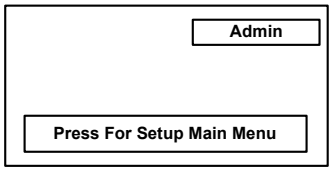

Figure 2-13 Display after startup

Please, note that the device is accessible over the Ethernet only after assignment of an IP address to the Ethernet.

2.4.1.3 Setup Main Mode

If you press the **Press For Setup Main Menu** button during the startup phase, the "Setup Main" mode starts.

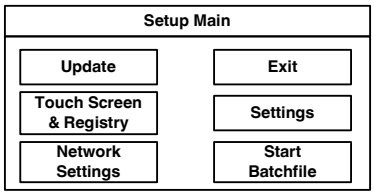

Bild 2-14 Setup Main

Some settings are password-protected. The default password is "+-+-".

Update:

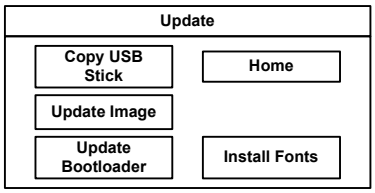

Bild 2-15 Update

Update, Copy USB Stick:

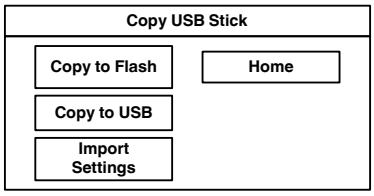

Figure 2-16 Copy USB Stick

Update, Copy USB-Stick, Copy to Flash:

This function copies the data from the USB stick to the internal flash file system.

Several projects can be managed in subdirectories below the directory TSvisRT. If more than one project is in different subdirectories, a choice dialog is displayed. Only directories which contain a project file (*.cb) are listed.

The entire TSvisRT directory or the corresponding subdirectory and the AppStarter.exe are copied into the target directory of the flash file system.

Update, Copy USB Stick, Copy to USB:

Copies the content of the flash file system to the „backup“ directory of the USB stick. This excludes protected system files. A log file is also transferred, which can be used to restore system settings via the „Import Settings“ item.

Update, Copy USB Stick, Import Settings:

An automatically generated log file can be used to restore the system settings. If the „backup“ directory of the USB stick contains a corresponding log file, these settings can be restored.
This is possible only when using identical device types.

Update, Update Image:

If the „image“ subdirectory on the USB stick contains a „*.nb0“ file, this file is used to perform the image update. There must be only one „*.nb0“ file located in this directory, otherwise the update does not start.

In this case, the flash registry is always deactivated so that the image is processed with a new default registry.

Update, Update Bootloader:

If the „bootloader“ subdirectory on the USB stick contains a „*.nb0“ file, this file is used to perform the bootloader update. There must be only one „*.nb0“ file located in this directory, otherwise the update does not start.

Touch Screen & Registry:

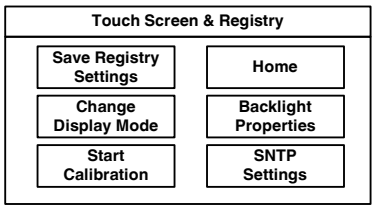

Bild 2-17 Touch Screen & Registry

Touch Screen & Registry, Save Registry Settings:

The entire registry is saved.

Touch Screen & Registry, Change Display Mode:

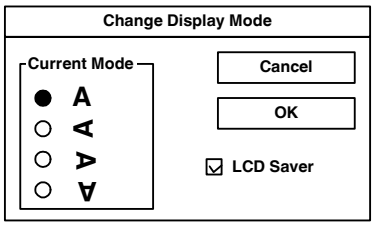

Bild 2-18 Change Display Mode

Set-up of display adjustment.

LCD Saver switches the brightness to the lowest value, if no user operation occures for at least one hour.

This entry is able to be password-protected.

Touch Screen & Registry, Start Calibration:

The touch calibration is started. After the calibration the values are stored automatically in the registry.

Touch Screen & Registry, Backlight Properties:

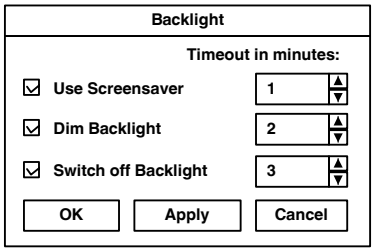

Bild 2-19 Backlight Properties

A screen saver can be activated after the defined time (minutes). It is possible to adjust the screen saver graphic by replacing the file "Screensaver.bmp" in the internal memory. The graphic is replaced at the start up of the operating device automatically when a USB stick - containing the file (Screensaver.bmp) in the "Screensaver" directory - is present.

The brightness of the backlight (dim backlight) can be reduced after the defined time (minutes) and turned off (backlight switch off) in addition.

This entry is able to be password-protected.

Touch Screen & Registry, SNTP Settings:

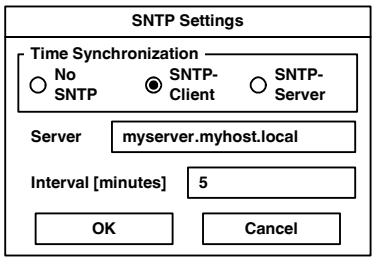

Bild 2-20 SNTP Settings

If you activate the "SNTP-Client" option, you can enter the address of a time server located in the intranet or Internet. The synchronization interval is specified in minutes.
With the option "No SNTP" the synchronization is deactivated.
The operating device may be used as a time server for other devices if the "SNTP-Server" option is active.

This entry is able to be password-protected.

Network Settings:

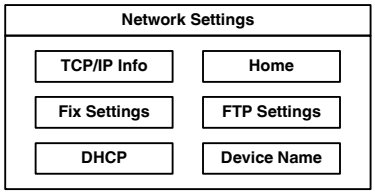

Figure 2-21 Network Settings

All addresses of the **Network Settings** have to be entered in the format "xxx.xxx.xxx.xxx".
Numbers smaller than 100 have to be filled up with leading zeros.
(e.g.: 192.168.42.1 -> 192.168.042.001)

Network Settings, TCP/IP Info:

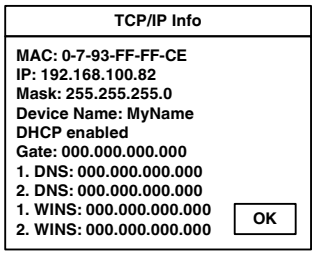

Figure 2-22 TCP/IP Info

The following informations are displayed:

– MAC address
– IP address
– Subnet mask address
– Device name
– DHCP status
– Gateway address
– 1. DNS address

– 2. DNS address
– 1. WINS address
– 2. WINS address

Network Settings, Fix Settings, IP Address:

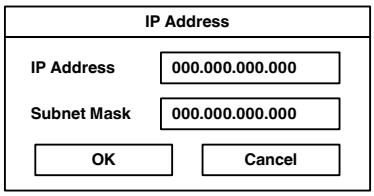

Figure 2-23 IP Address

The system automatically deselects DHCP and optionally enters the settings from the „IPSetting.ini“ file of the USB stick. This file must exist in the root directory of the USB stick.
If no USB stick is connected the information is read from the registry.

This entry is able to be password-protected.

Contents of the „IPSetting.ini“ file:

```
[IPCONFIG]
IPAddress=172.016.042.150
SubnetMask=255.255.255.000
```

All addresses of the **Network Settings** have to be entered in the format "xxx.xxx.xxx.xxx".
Numbers smaller than 100 have to be filled up with leading zeros.
(e.g.: 192.168.42.1 -> 192.168.042.001)

Network Settings, Fix Settings, Gateway:

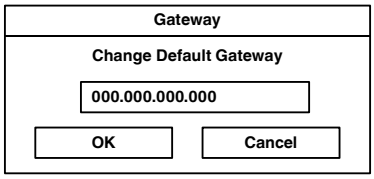

Figure 2-24 Gateway

The system automatically deselects DHCP and optionally enters the settings from the „IPSetting.ini“ file of the USB stick. This file must exist in the root directory of the USB stick.
If no USB stick is connected the information is read from the registry.

This entry is able to be password-protected.

Contents of the „IPSetting.ini“ file:

```
[IPCONFIG]
Gateway=172.016.042.150
```

All addresses of the **Network Settings** have to be entered in the format "xxx.xxx.xxx.xxx".
Numbers smaller than 100 have to be filled up with leading zeros.
(e.g.: 192.168.42.1 -> 192.168.042.001)

Network Settings, Fix Settings, DNS:

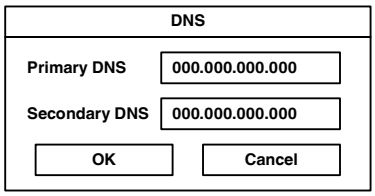

Figure 2-25 DNS

The system deselects DHCP and enters the settings from the „IPSetting.ini“ file of the USB stick. This file must exist in the root directory of the USB stick.
If no USB stick is connected the information is read from the registry.

This entry is able to be password-protected.

Contents of the „IPSetting.ini“ file:

```
[IPCONFIG]
PrimaryDNS=172.016.042.150
SecondaryDNS=172.016.042.151
```

All addresses of the **Network Settings** have to be entered in the format "xxx.xxx.xxx.xxx".
Numbers smaller than 100 have to be filled up with leading zeros.
(e.g.: 192.168.42.1 -> 192.168.042.001)

Network Settings, Fix Settings, WINS:

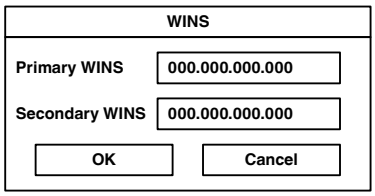

Figure 2-26 WINS

The system automatically deselects DHCP and optionally enters the settings from the „IPSetting.ini“ file of the USB stick. This file must exist in the root directory of the USB stick.
If no USB stick is connected the information is read from the registry.

This entry is able to be password-protected.

Contents of the „IPSetting.ini“ file:

```
[IPCONFIG]
PrimaryWINS=172.016.042.150
SecondaryWINS=172.016.042.151
```

All addresses of the **Network Settings** have to be entered in the format "xxx.xxx.xxx.xxx".
Numbers smaller than 100 have to be filled up with leading zeros.
(e.g.: 192.168.42.1 -> 192.168.042.001)

Network Settings, DHCP:

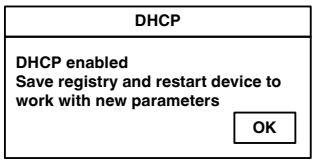

Bild 2-27 DHCP

You may enable DHCP service. You must save this setting when exiting of by using „Save Registry Settings“.

This entry is able to be password-protected.

Network Settings, FTP Settings, Add new user:

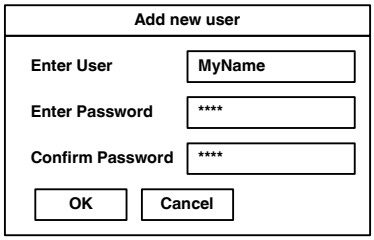

Bild 2-28 Add new user

You may enter a new user name. You have to assign a password to the user name and to confirm it.

If at least one user name is added you cannot login to the FTP server as anonymous anymore.

Network Settings, FTP Settings, List all users:

All users are listed within a DOS box.

Network Settings, FTP Settings, Delete a user:

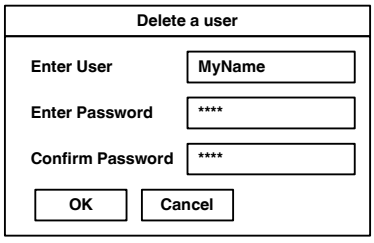

Bild 2-29 Delete a user

You may enter the user name you like to delete.

This entry is able to be password-protected.

Network Settings, Device Name:

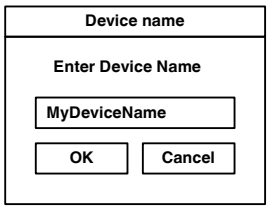

Bild 2-30 Device Name

You can define a device name with up to 14 characters. Via a FTP connection you can access the device with the device name instead of the IP address.

This entry is able to be password-protected.

Settings:

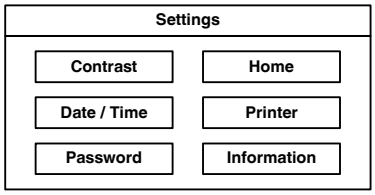

Bild 2-31 Settings

Settings, Contrast:

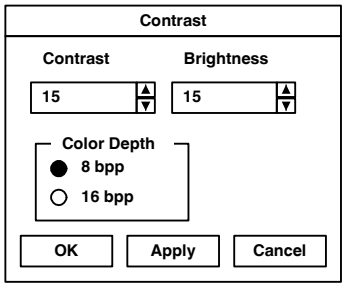

Figure 2-32 Contrast

The operating mode setup main is displayed with default values for contrast and brightness to ensure reading also at faulty values. If you change a value, you have to confirm this in a dialog. If you press **Cancel** or 5 seconds pass without any action the value is not accepted.
Depending on the display type different values can be influenced:

Table 2-2

Display Type	Contrast	Brightness
STN (mono)	X	-
STN (color)	X	X
TFT	-	X

Selection of color depth for TFT displays.

This entry is able to be password-protected.

Settings, Date / Time:

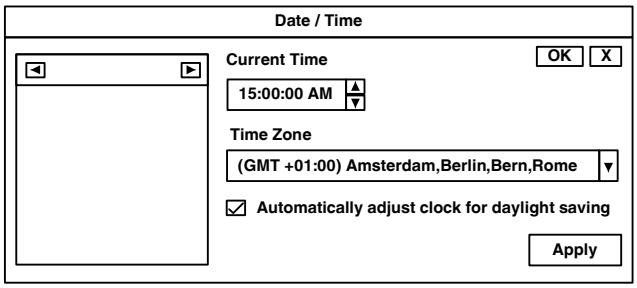

Bild 2-33 Date / Time

Set the date, time and time zone.

Settings, Password:

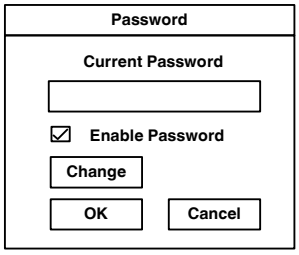

Bild 2-34 Password

The password can be activated, deactivated or redefined. When the password is activated, all password-protected dialog boxes can only be accessed if the password has been entered successfully.

This entry is able to be password-protected.

Settings, Printer:

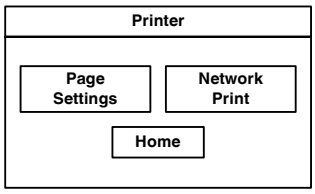

Bild 2-35 Printer

The print function depends on the application program on the operating device. Connection of a printer is possible via the network and the USB interface. The operating system supports PCL3-compatible printers.

Tabelle 2-3 Already used printer models

Model
HP OfficeJet 6000
HP OfficeJet Pro 8000
HP DeskJet 6940
HP DeskJet 5150
HP Laserjet 1505N

This entry is able to be password-protected.

Settings, Printer, Page Settings:

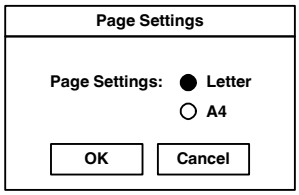

Bild 2-36 Page Settings

Select the paper format, "Letter" or "A4", "Letter" is default.

This entry is automatically stored in the registry.

Settings, Printer, Network Print:

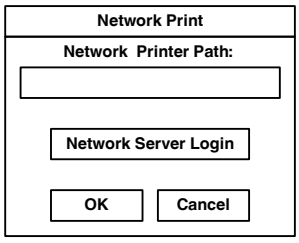

Bild 2-37 Network Print

Enter the network printer path.

This entry is automatically stored in the registry.

Settings, Printer, Network Print, Network Server Login:

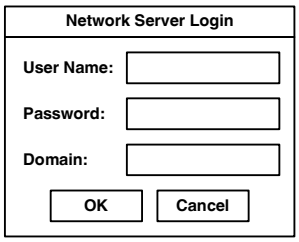

Figure 2-38 Network Server Login

You can save login data for network printing. This enables auto-login when printing without manual input at the operating device.

Enter a user name, password and domain.

This entry is automatically stored in the registry.

Settings, Information:

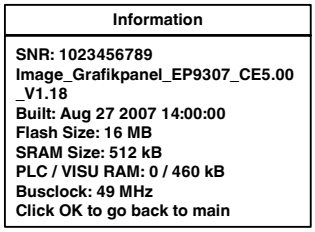

Figure 2-39 Information

The following informations are displayed:

– Serial number
– Product ID
– Image version
– Built version
– Built date
– Size of flash
– Size of SRAM
– Size of PLC / Visu RAM
– Bus clock speed

Start Batchfile:

The „project.bat“ file in the „FlashDrv“ directory starts, if available.

2.4.1.4 Administration Operating Mode

If you press the **Admin** button during the startup phase, the Administration mode of operation starts.

You can use the Admin.ini file to manage the device. This file must exist in the root directory of the USB stick.

This file is used as a dongle to prevent users from changing the device during normal operation.

Possible contents for the Admin.ini file:

Observe upper and lower case for all entries!

Explorer=Off	Deactivates the Explorer in the registry. The change becomes effective on the next device reboot.
Explorer=On	Activates the Explorer in the registry. The change becomes effective on the next device reboot.
Start=explorer.exe	Starts the explorer
Start=MyProgram.exe	Starts the application MyProgram.exe Initial directory is windows. Use the following syntax to start an application on the usb stick: Start=\\\\HardDisk\\MyProgram.exe Use multiple entries to start several applications.
Registry=Default	Destroys the current registry and activates the default registry of the image. The change becomes effective on the next device reboot.
StartRepllog=On	Enables automatic startup of the Repllog.exe program in the registry. The change becomes effective on the next device reboot.
StartRepllog=Off	Disables automatic startup of the Repllog.exe program in the registry. The change becomes effective on the next device reboot.
LaunchTouch=On	The touch variant of the launch will start at devices with keyboard. The change becomes effective on the next device reboot.
LaunchTouch=Off	The standard variant for the device will start. The change becomes effective on the next device reboot.
Lock=On	The buttons **Press for Setup Main Menu** and **Admin** are disabled. If the file „Admin.ini“ is found on the usb stick the button **Admin** is enabled. Therefore the deactivation of the lock is possible. The change becomes effective on the next device reboot.
Lock=Off	All buttons enabled. The change becomes effective on the next device reboot.
Mode=Development	The shell has full functionality. The change becomes effective on the next device reboot.

Mode=Standard	The Shell is restricted: No task bar and task switch available. Desktop contains the launch icon only. The change becomes effective on the next device reboot.
DeviceName=MyName	Defines the device name of the operating device
;DeviceName=MyName	Comment, no impact

2.4.2 Important Files and Update

Tabelle 2-4 Important files and update

File	Storage location	Update	Function
*.nb0	Subdirectory **Bootloader**	Menu item "Update Bootloader" in operating mode setup main via USB stick	Windows CE Bootloader
*.nb0	Subdirectory **Image**	Menu item "Update Image" in operating mode setup main via USB stick	Operating system Windows CE
AppStarter.EXE	**Root directory** on USB stick	Menu item "Copy USB Stick" in operating mode setup main via USB stick	Starts starter.bat
Admin.INI	**Root directory** on USB stick	-	File with administration settings
IPSetting.INI	**Root directory** on USB stick	-	File with settings for IP assignment
starter.bat	**Root directory** on FlashDrv	-	Starts a user-defined application on startup
project.bat	**Root directory** on FlashDrv	-	Starts a user-defined application from within the launcher

2.5 Identification

The operating device can be identified using the nameplate on the rear of the device.

Bild 2-40 Nameplate (example)

1 Order number
2 Version key (at time of delivery)
3 MAC address
4 Voltage and power specification
5 Serial number

2.5.1 Version Key

The version key provides information on the version level of various components at time of delivery.

3 Control and Display Elements

3.1 Display

DANGER: Toxic
If the display is damaged, avoid touching, swallowing or breathing in the liquids or gases which may leak out!

DANGER: Corrosive
If the display is damaged, avoid touching, swallowing or breathing in the liquids or gases which may leak out!

Pixel failures, which can occur with TFT displays, are due to production and no complaint reason!

3.1.1 Touch Screen

The device is equipped with a touch screen. You operate the device using this touch screen.

4 Interfaces of the Device

4.1 TPE043AGB

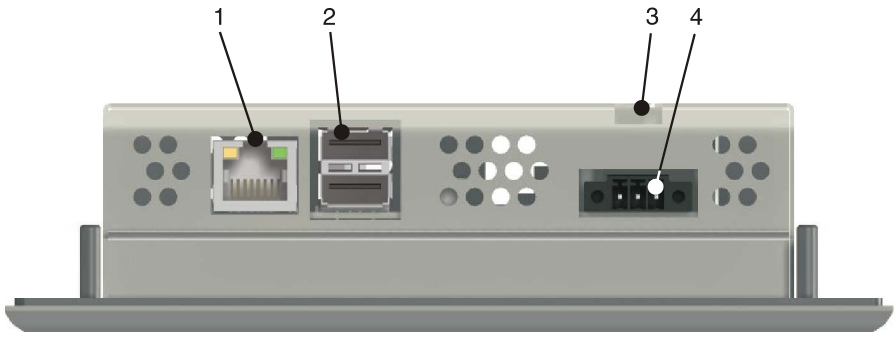

Figure 4-1 Interfaces of the device

1 Female Connector X5 (Ethernet)
2 Female Connector X9, X10 (USB Host - Type A)
3 Flat Push-on Connection for Noiseless Grounding
4 Connector X1 (Supply Voltage)

4.2 TPE057AGQ

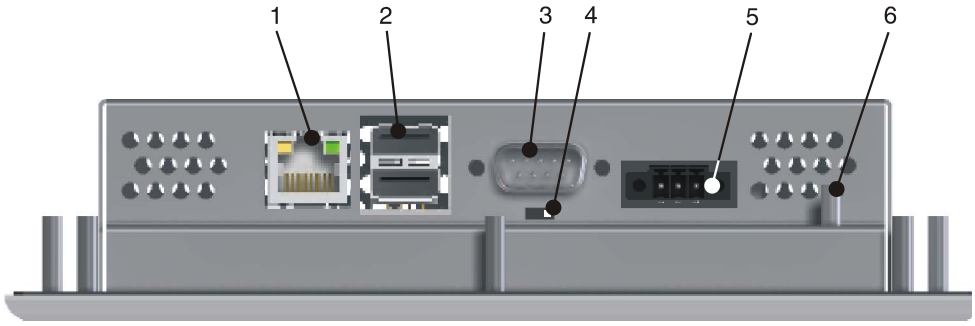

Figure 4-2 Interfaces of the device

1 Female Connector X5 (Ethernet)
2 Female Connector X9, X10 (USB Host - Type A)
3 Female Connector X7 (RS422/RS485) - optional
4 Termination Switch (RS422/RS485) - optional
5 Connector X1 (Supply Voltage)
6 Threaded Bolt For Protective Grounding

4.3 TPE070AGW

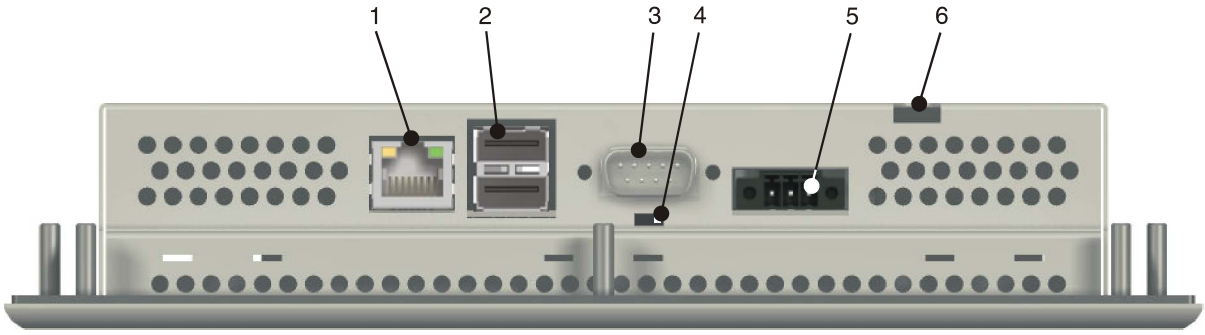

Figure 4-3 Interfaces of the device

1 Female Connector X5 (Ethernet)
2 Female Connector X9, X10 (USB Host - Type A)
3 Female Connector X7 (RS422/RS485) - optional
4 Termination Switch (RS422/RS485) - optional
5 Connector X1 (Supply Voltage)
6 Flat Push-on Connection for Noiseless Grounding

4.4 Ethernet (X5)

A 10/100Base-T Ethernet interface is located at the operating device.

4.4.1 Pin Assignment

Connector in the operating device: RJ45 female connector.

Table 4-1 Assignment of the Ethernet interface

Pin	Designation	Function
1	Tx+	Transmitted Data, Positive Polarity
2	Tx-	Transmitted Data, Negative Polarity
3	Rx+	Received Data, Positive Polarity
4	n.c.	Not Connected
5	n.c.	Not Connected
6	Rx-	Received Data, Negative Polarity
7	n.c.	Not Connected
8	n.c.	Not Connected

4.4.2 Cable

NOTICE
Use a twisted pair cable of category 5 (CAT 5). The maximum cable length is 100 m (328.084 feet).

See the IEEE 802.3 standard for further information.

4.4.3 Diagnostics

Ethernet diagnostics LEDs are located at the operating device.

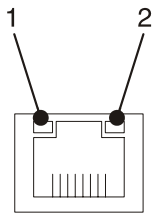

Figure 4-4 Position of the ethernet diagnostics LEDs

Table 4-2 Function of the ethernet diagnostics LEDs

No.	Color	State	Designation	Function
1	Green	ON	XMT	Sending ethernet data telegram
2	Yellow	ON	RCV	Receiving ethernet data telegram

4.5 RS-422 / RS-485 (X7)

The interface standard RS-422 / RS-485 is suitable for point-to-point and multi-point connections.

The wires belonging together are marked with „A“ and „B“. Some descriptions refer to the pins with „-“ and „+“ , where A = - and B = +.

Signal Logic 1	$U_A - U_B <= -0.3$ V i.e. ($U_A < U_B$)
Signal Logic 0	$U_A - U_B >= +0.3$ V i.e. ($U_A > U_B$)

4.5.1 Pin Assignment

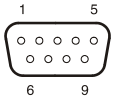

Figure 4-5 9 pin D-SUB male connector strip

Connector in the operating device: 9 pin D-SUB male connector strip.

Table 4-3 Pin assignment RS422/RS485

Pin	Designation	Function		
1	SGND	Signal Ground		
2	T(A)	Transmitted Data (-)	-	N
3	T(B)	Transmitted Data (+)	+	P
4	R(B)	Received Data (+)	+	P
5	R(A)	Received Data (-)	-	N
6	nc	Not Connected		
7	nc	Not Connected		
8	nc	Not Connected		
9	nc	Not Connected		

NOTICE:
The D-SUB connector strips must be shielded sufficiently. See chapter “Shielding D-SUB Connectors“ on page 4-44.

4.5.2 Termination

Always turn on the termination in a 4-wire point-to-point connection (RS-422 / RS-485). A sender termination for the quiescent level of the receiver must exist on the remote station.

Turn on the termination only at the two ends of the lines in a 2 or 4-wire multi-point connection (RS-422 / RS-485).

The switch positions for ON (left position) or OFF (right position) are labeled at the operating device. Only the specified switch positions are allowed.

Table 4-4 Termination switch

Bus	Transmitter	Function
2-wire 4-wire –	OFF	Termination is OFF – Line termination is assured by other participants – The quiescent level is ensured by external wiring – RS422 / RS485 unused
2-wire	ON	Transmitter Termination is ON (Guarantees quiescent level)
4-wire	ON	Transmitter Termination is ON Receiver Termination (Point-to-point or multi-point connection at the end of the line)

4.6 USB (X9, X10)

Two host interfaces are available on the operating device.

NOTICE:
Using hardware not suitable for industrial use (for example keyboard, mouse, memory card) in industrial environments may decrease safety of operation. This includes hardware intended for home and office use.

NOTICE: Damage
The use of this interface is permitted only within the temperature range of - 20 °C to + 55 °C (- 4 °F to + 131 °F).

4.6.1 Cable

For the specification of a suitable cable, please refer to the „Universal Serial Bus Specification Rev. 2.0“.

NOTICE:
Use industrial-suited USB cables with a length of maximally 2.5 m (8.202 feet).

4.7 Shielding D-SUB Connectors

You must shield D-SUB connectors as follows:

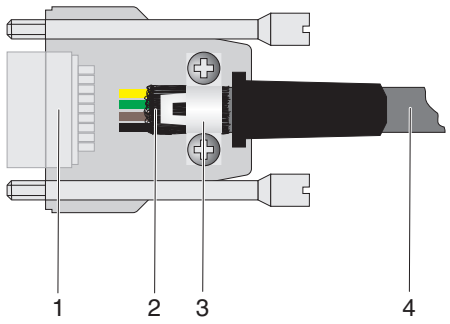

Figure 4-6 Shielding D-SUB connectors

1 D-SUB connector
2 Shield
3 Cable clip
4 Cable

The shield must be folded back into a flat position over the cable sheath.

When fastening the cable with the cable clip, as much of the shielding as possible must be in contact with the housing and sufficient strain relieve must be ensured.

5 Maintenance and Servicing

5.1 Front Panel

Only use a damp cloth to remove any dirt from the front panel.

5.2 Fuse

NOTICE: Damage
The semiconductor fuse cannot be replaced!

A semiconductor fuse is used to protect the device. Once the fuse has been tripped, the device must be disconnected from the supply voltage to allow the semiconductor fuse to regenerate. At an ambient temperature of 20 °C (68 °F), the regeneration takes approximately 20 seconds. The higher the ambient temperature, the longer the regeneration takes.

5.3 Battery

The built-in battery preserves the data in the SRAM and supplies the real-time clock with power. The minimum battery life is 5 years, even under unfavorable operating conditions. When the battery runs down, the message "Change battery" is generated automatically.

We recommend you change the battery approximately every 4 years as part of the regular maintenance work. A prepared battery including connector can be obtained directly from Sütron electronic.

If the "Change battery" message is detected too late, data in the SRAM may have already been lost. For this reason, after changing a battery, always check data such as editable passwords, parameters in the system variables, data sets of the recipes and entries in the message system.

5.3.1 Changing the Battery

CAUTION: Explosive
Do not throw lithium batteries into fire, do not heat to 100 °C or higher and do not recharge.

CAUTION: Toxic
Do not open lithium batteries.

NOTICE: Damage
Batteries must only be changed by authorized and trained experts!

NOTICE: Damage
For changing the battery you may only use replacement batteries of Sütron electronic.

NOTICE: Damage
Electrostatic discharge can damage electronic components. Observe the ESD protective measures!

To ensure that the data in the SRAM and the time are preserved, it is possible to change the battery under operating voltage. Observe the corresponding safety notices!

1. Remove the screws on the rear of the device and lift off the enclosure cover.
2. Remove the glue strip securing the battery.
3. Disconnect the connector from the battery and remove the dead battery.
4. Plug in the cable for the new battery.
5. Use a glue strip to attach the new battery to the enclosure.
6. Place the enclosure cover back onto the device.
7. Carefully tighten the screws of the enclosure cover.

5.3.2 Battery Disposal

The manufacturer is obliged to mark batteries with this symbol before first placing into market. The symbol is extended by the chemical symbols if the following limiting values are exceeded:

More than 0.0005 mass percent mercury	Hg
More than 0.002 mass percent cadmium	Cd
More than 0.004 mass percent lead	Pb

Batteries can be given back free of charge after use at the place of purchase.

According to the §11 of the battery law, final consumers are obligedly to give old batteries back to gathering points which attached to the common take back system or manufacturer-specific take back systems.

NOTICE: Damage
To prevent short circuitry in the collection boxes, insulate the poles of each battery with insulation tape or put each single battery into a plastic bag.

6 Technical Data

6.1 General

Touch Screen	
Type	Low Reflective GFG (glass film glass), analog resistive, 4 wire technology
Activation force	Input area A (area within 20 mm, circulating): Minimum / maximum: 0,3 N / 1,5 N Average: 0,9 N Input area B (marginal area of 20 mm, circulating): Minimum / maximum: 0,5 N / 2,5 N Average: 1,2 N With R8 silicon rubber
Durability	No damages or malfunctions after 10 million keystrokes as the following: Keystroke element: R8 silicon rubber Keystroke load: 250 g Keystroke frequency: 2 Hz

Ethernet	
X5 Ethernet	10/100Base-T

Serial Interfaces	
Variable baud rates and data formats	
X7 RS-422 / RS-485	In accordance with DIN 66259-4 Transmission length: 0 - 1200 m, twisted pair wire, shielded Galvanically isolated

USB	
Corresponds to the „Universal serial bus specification Rev. 2.0“	
The use of this interface is permitted only within the temperature range of - 20 °C to + 55 °C (- 4 °F to + 131 °F).	
X9, X10 Host	Min.: 1.5 Mbit/s Max.: 12 Mbit/s Max. output current 100 mA per output

Central Processing Unit	
Central processing unit	RISC ARM9
Clock frequency	184 MHz
Other features	Watchdog timer

Memory	
Flash	64 MByte
SDRAM	128 MByte
NVSRAM	512 KByte

Connection System
Male connector strip Phoenix MINI-COMBICON, 3 pin (Art.-No. 1847068)
RJ45 male connector
USB male connector type A

Standards and Guidelines	
Interference immunity	DIN EN 61000-4-2 DIN EN 61000-4-3 DIN EN 61000-4-4 DIN EN 61000-4-5 DIN EN 61000-4-6 DIN EN 61000-6-2
Emitted interference	DIN EN 55011 limit value class B DIN EN 61000-6-4
Equipment requirements	DIN EN 61131-2
Storage and transportation	DIN EN 61131-2
Power supply	DIN EN 61131-2
Electromagnetic compatibility	2004/108/EG
Degrees of protection	DIN EN 60529
Impact load, shocks	DIN EN 60068-2-27
Sinusoidal vibrations	DIN EN 60068-2-6

6.2 TPE043AGB

Display	
Type	TFT (color)
Resolution (pixels)	480 x 272
Colors	65536
Reading angle (vertical / horizontal)	120° / 150°
Half-life backlighting	40,000 h
Brightness in cd/m^2	400
Display area (H x W) in mm (Inch)	53.8 x 95 (2.118 x 3.74)

Environmental Conditions	
Temperature during operation	- 20 °C to + 70 °C (- 4 °F to + 158 °F)
Temperature during storage, transport	- 30 °C to + 80 °C (- 22 °F to + 176 °F)
Relative air humidity for operation and storage	Front: 5 % to 95 % Rear: 20 % to 85 %, no condensation
Operating altitude (above sea level)	0 m to 4000 m
Application area	Degree of pollution 2, overvoltage category III

Electrical Data	
Supply voltage	24 V DC (SELV / PELV in accordance with DIN EN 61131)
Residual ripple	10 % maximum
Minimum voltage	18 V
Maximum voltage	30 V
Power consumption (typical at 24 V)	0.2 A
Power consumption (maximum)	0.25 A
Connected load	4.8 W
Fuse	Semiconductor fuse, self-resetting
Protection against polarity reversal	Integrated

Front Panel and Enclosure	
Enclosure	Steel sheet, galvanized
Front panel material	Aluminium, brushed, anodized natural finish
Front panel (H x W x D) in mm (Inch)	131 x 171 x 5 (5.157 x 6.732 x 0.196)
Seal	Flat gasket on the rear
Mounting cutout (H x W) in mm (Inch)	95 x 135 (3.74 x 5.314)
Mounting depth in mm (Inch)	42 (1.653)
Degree of protection	Front: IP67 / Enclosure Type 4X (indoor / outdoor use) Rear: IP20
Total weight	About 550 g

Approvals
CE, UL, cUL

6.3 TPE057AGQ

Display	
Size (diagonal) in cm (inch)	14.48 (5.7)
Type	TFT (color)
Resolution (pixels)	320 x 240
Colors	65536
Reading angle (vertical / horizontal)	135° / 150°
Half-life backlighting	40,000 h
Brightness in cd/m^2	400
Display area (H x W) in mm (Inch)	86.4 x 115.2 (3.402 x 4.535)

Environmental Conditions	
Temperature during operation	- 20 °C to + 70 °C (- 4 °F to + 158 °F)
Temperature during storage, transport	- 30 °C to + 80 °C (- 22 °F to + 176 °F)
Relative air humidity for operation and storage	Front: 5 % to 95 % Rear: 20 % to 85 %, no condensation
Operating altitude (above sea level)	0 m to 4000 m
Application area	Degree of pollution 2, overvoltage category III

Electrical Data	
Supply voltage	24 V DC (SELV / PELV in accordance with DIN EN 61131)
Residual ripple	10 % maximum
Minimum voltage	18 V
Maximum voltage	30 V
Power consumption (typical at 24 V)	0.2 A
Power consumption (maximum)	0.25 A
Connected load	4.8 W
Fuse	Semiconductor fuse, self-resetting
Protection against polarity reversal	Integrated

Front Panel and Enclosure	
Enclosure	Steel sheet, galvanized
Front panel material	Aluminium, brushed, anodized natural finish
Front panel (H x W x D) in mm (Inch)	153 x 195 x 5 (6.023 x 7.677 x 0.196)
Seal	Flat gasket on the rear
Mounting cutout (H x W) in mm (Inch)	119 x 161 (4.685 x 6.338)
Mounting depth in mm (Inch)	42 (1.653)
Degree of protection	Front: IP67 / Enclosure Type 4X (indoor / outdoor use) Rear: IP20
Total weight	About 750 g

Approvals
CE, UL, cUL

6.4 TPE070AGW

Display	
Size (diagonal) in cm (inch)	17.78 (7)
Type	TFT (color)
Resolution (pixels)	800 x 480
Colors	65536
Reading angle (vertical / horizontal)	130° / 140°
Half-life backlighting	40,000 h
Brightness in cd/m^2	350
Display area (H x W) in mm (Inch)	91.4 x 152.4 (3.598 x 6.0)

Environmental Conditions	
Temperature during operation	- 20 °C to + 70 °C (- 4 °F to + 158 °F) - 20 °C to + 55 °C (- 4 °F to + 131 °F) - (for applications according to UL 508)
Temperature during storage, transport	- 30 °C to + 80 °C (- 22 °F to + 176 °F)
Relative air humidity for operation and storage	Front: 5 % to 95 % Rear: 20 % to 85 %, no condensation
Operating altitude (above sea level)	0 m to 4000 m
Application area	Degree of pollution 2, overvoltage category III

Electrical Data	
Supply voltage	24 V DC (SELV / PELV in accordance with DIN EN 61131)
Residual ripple	10 % maximum
Minimum voltage	18 V
Maximum voltage	30 V
Power consumption (typical at 24 V)	0.3 A
Power consumption (maximum)	0.4 A
Connected load	7.2 W
Fuse	Semiconductor fuse, self-resetting
Protection against polarity reversal	Integrated

Front Panel and Enclosure	
Enclosure	Steel sheet, galvanized
Front panel material	Aluminium, brushed, anodized natural finish
Front panel (H x W x D) in mm (Inch)	174 x 234 x 5 (6.85 x 9.212 x 0.196)
Seal	Flat gasket on the rear
Mounting cutout (H x W) in mm (Inch)	140 x 200 (5.511 x 7.874)
Mounting depth in mm (Inch)	42 (1.653)
Degree of protection	Front: IP67 / Enclosure Type 4X (indoor / outdoor use) Rear: IP20
Total weight	About 1000 g

Approvals
CE, UL, cUL

NOTICE
For applications according to UL 508 the maximum temperature during operation is 55 °C (131 °F).

7 Ordering Data

Tabelle 7-1 Accessories

Description	Article No.
USB 2.0 stick 1 GB	81152.100
USB 2.0 stick 2 GB	81152.200
USB 2.0 stick 8 GB	81152.800
Battery, assembled with cable and connector (Type: CR2450)	66779.100
Protective foil for touch screen 4,3" (Set with 10 protective foils, scraper and instructions)	81251.043
Protective foil for touch screen 5,7" (Set with 10 protective foils, scraper and instructions)	81251.056
Protective foil for touch screen 7" (Set with 10 protective foils, scraper and instructions)	81251.070

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